

Fabrication of a Diffusion Cooled Superconducting Hot Electron Bolometer for THz Mixing Applications --

B. Bumble, H.G. LeDuc, Jet Propulsion Laboratory, Pasadena, CA ---
Recent interest in bolometers for heterodyne mixing applications has prompted development of microbridges which are small enough to allow electron diffusion to dominate over electron-phonon interaction as a cooling mechanism.⁽¹⁾ Prior results at 533GHz have demonstrated several GHz IF bandwidth.⁽²⁾ Here we describe our processing method in which the bolometer element is a 10nm thin film of niobium defined by electron beam lithography down to a width of 80nm. Gold pads of 100nm thickness define the bolometer length also down to 80nm. This microbridge element is embedded in a normal metal (Au) antenna structure for 1.2 and 2.5 THz applications.

(1) D.E. Prober, Appl. Phys. Lett. 62, 2119 (1993)

(2) A. Skalar, W.R. McGrath, B. Bumble, H.G. LeDuc, P.J. Burke, A.A. Verheijen, D.E. Prober, IEEE Trans. Appl. Supercond. 5, 2236 (1995)

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Registrant:	H. G. LeDuc
Correspondence Author:	Bruce Bumble
	M/S 302-231
	Jet Propulsion Laboratory
	4800 Oak Grove Drive
	Pasadena, CA 91109-8099
Tel:	(818)354-5117
Fax:	(818) 393-4540
E-mail:	Bbumble@vaxeb.jpl.nasa.gov
Preference:	letter

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